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FILE: SPECIES - TRIPLETAIL

A STOCK ASSESSMENT OF TRIPLETAIL, *LOBOTES SURINAMENSIS*,  
IN FLORIDA WATERS

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1 HR 1996-001

## Executive Summary

The present condition of the stock is unknown due to uncertainty associated with available life history information and with the estimates of recreational landings. Comparisons of present estimates of instantaneous fishing mortality rate ( $F=0.24-0.54$ ) with biological reference points indicate the stock is in good condition at this time. This finding, however, is based on preliminary data. Estimates of spawning potential ratio range from 21-57% depending on the value of natural mortality assumed. Fishing mortality appears to be low to moderate. Because tripletail are fast growing and mature at an early age, it is likely the population can sustain relatively high fishing mortality.

New information on age and growth are presented. Maximum ages in the samples were six years for males and seven years for females. The ageing data, although preliminary and unvalidated, indicate that tripletail grow rapidly in the first few years of life. Females are slightly larger at age than males. Based on histological examination of the gonads, the smallest mature male was 305 mm TL and the smallest mature female was 360 mm TL. It is estimated that males mature at about 300-400 mm TL and females at about 350-450 mm TL.

Commercial tripletail landings have ranged between 20,000-40,000 pounds per year since 1990. Most landings came from the Atlantic coast. About 200-300 fishermen participated in the tripletail fishery, and few (2-6) landed greater than 1000 pounds per year. Gill nets were the principal commercial gear used to land tripletail. More than 90% of the annual landings came from the recreational fishery. Statewide recreational landings ranged from about 230,000-550,000 pounds during 1991-1995, with higher landings on the Atlantic coast. The estimates of recreational landings have varied greatly, and we regard the estimates as unreliable because of the small number of MRFSS interviews conducted.

## I. BIOLOGICAL CHARACTERISTICS

### Data Sources

Little published information exists on the biology of tripletail. Gudger (1931), Baughman (1941, 1943), and Breder (1949) discussed behavior, distribution and natural history of tripletail but presented little supporting data. Other sources of information are Merriner and Foster (1974), Ditty and Shaw (1994), and unpublished DEP/FMRI data.

### Morphometrics

Relationships between total length (TL) and weight were fit to a linear regression model using log transformed data pooled from collections on the east and west coasts of Florida. The back-transformed equations were as follows:

Combined sexes

$$\text{Weight (g)} = 7.046 \times 10^{-6} (\text{TL in mm})^{3.182} \quad r^2 = 0.98 \quad n = 843$$

Males

$$\text{Weight (g)} = 5.610 \times 10^{-6} (\text{TL in mm})^{3.217} \quad r^2 = 0.98 \quad n = 327$$

Females

$$\text{Weight (g)} = 5.076 \times 10^{-6} (\text{TL in mm})^{3.237} \quad r^2 = 0.98 \quad n = 370$$

Analysis of covariance indicated that females were significantly heavier at length than males.

There is a linear relationship between weight and gutted weight as follows:

Combined sexes

$$\text{Weight (g)} = 1.0857 (\text{Gutted Weight in g.}) - 56.022 \quad r^2 = 0.97 \quad n = 715$$

This equation can be used to estimate the total weight of landed fish when only gutted weights are available, as is frequently the case in the commercial fishery.

### Stock Distribution

No information exists on tripletail stock structure. Tripletail occur worldwide in warm seas. In the western Atlantic, they occur from Cape Cod to Argentina, and throughout the Gulf of Mexico and the Caribbean.

### Reproductive Life History

Ditty and Shaw (1994) examined the distribution of tripletail larvae in the Gulf of Mexico and found that spawning begins in May and extends through September, with peak spawning during July and August. The smallest larvae were found over the continental shelf in oceanic waters suggesting offshore spawning.

Preliminary results from histological examination of tripletail gonads indicate that males mature at about 300-400 mm TL and females at about 350-450 mm TL. The smallest mature fish examined were 305 and 360 mm TL for males and females, respectively.

### Growth Patterns

Merriner and Foster (1974) aged 13 individuals from North Carolina waters using scales and found that growth was rapid. Tripletail reached approximately nine pounds by an age of 1-2 years. The oldest fish examined was only 3 years old, but they speculated tripletail reach ages of 7-10 years and a maximum size of about 45 pounds.

For the present assessment, annuli were read from sectioned otoliths removed from a sample of 260 tripletail obtained primarily from a commercial fish house on the east coast of Florida. The sample contained 120 males, 126 females, and 14 unsexed individuals. Total length range was 307-793 mm TL for males and 320-805 mm TL for females. Ages ranged from 0-7 years and maximum ages were 6 for males and 7 for females. Lengths at estimated ages are plotted in Figure 1. These data indicate that tripletail grow extremely fast in the first few years of life. Based on this growth rate and the preliminary estimates of length at maturity, tripletail could reach sexual maturity at age-1. Males appear to be slightly smaller at age than females. These data are preliminary in nature because the ages have not been validated. Experiments are in progress to accomplish the required validation. Some of the estimates of length for age-0 fish seem unrealistically high. The otoliths are relatively difficult to read but ongoing research may resolve the difficulties in ageing and refine the present age estimates.

## II. FISHERY CHARACTERISTICS

### Commercial Harvest

Sources of commercial landings statistics were the National Marine Fisheries Service's General Canvas for landings information prior to 1986 and Florida's Marine Fisheries Information System (MFIS), also known as the trip ticket system, for landings after 1986. Trip tickets include measures of effort in addition to pounds landed. Trip Ticket data included

in the assessment were those received by DEP/FMRI through April 25, 1996 (Batch 411). Length frequencies of commercially caught tripletail were obtained from the Trip Interview Program of FMRI. These data were pooled from the years 1992-1995.

Statewide commercial landings averaged about 5,000 pounds during 1981-1985. The MFIS did not record tripletail landings separate from other fishes landed in small volumes until 1991. Reported landings between 1991 and 1995 increased from 7,400 pounds to over 40,000 pounds. Landings on the Gulf coast of Florida remained relatively stable at less than 1,000 pounds for most years between 1981 and 1995 (Table 1a). However, Atlantic coast landings increased sharply during the early 1990's, increasing from about 5,000 pounds during 1981-1985 to an average of about 30,000 pounds each year during 1991-1995 (Table 1b). The geographic distribution of commercial tripletail landings is shown in Figure 2.

Most landed tripletail were between 300-700 mm TL with a peak mode at about 550 mm TL (Figure 3). The mean length of landed tripletail was 521 mm TL. Based on the preliminary ages, most of the landed fish were age-1, 2 or 3 (Figure 4).

The greatest landings occur during the spring, March-May, on the Atlantic coast although large landings can also occur during the fall. Gulf landings do not appear to be highly seasonal although the few monthly landings reported over 100 pounds occurred during the summer and early fall (Table 2).

Only a small number of fishermen participate in the commercial tripletail fishery (Table 3). On the Atlantic coast, less than about 25 licenses were responsible for annual landings of more than 100 pounds, and three or fewer licenses were responsible for annual landings of more than 5,000 pounds. Less than 50 commercial SPL holders were responsible for the commercial landings on the Gulf coast each year between 1991 and 1995. On both coasts and during all years for which gear data were available from the MFIS, 1992-1995, gill nets were used to catch most of the tripletail that were landed (Table 4).

The species of fishes caught with tripletail are representative of Florida's nearshore marine fishes that are vulnerable to gill nets (Table 5). Bluefish, pompano, sheepshead, and Spanish mackerel were the most abundant fishes caught with tripletail. Others caught in about 10% of the tripletail trips were catfish, flounders, crevalle jack, spotted seatrout, spot, and whiting.

### Recreational Harvest

Recreational harvest estimates for tripletail are probably unreliable since few fishermen capturing tripletail are included in the survey. The best data available are during the 1990's

on the Atlantic coast when the number of angler intercepts increased to more than 50 per year. During these years tripletail harvest was estimated to be 36,000-78,000 fish per year on the Atlantic coast (Table 1b and Figure 5a). Less reliable estimates for the Gulf coast during these years ranged from about 1,000 fish during 1992 to 28,000 fish during 1991 (Table 1a and Figure 5b). The geographic distribution of recreational tripletail landings is shown in Figure 6.

Length frequencies of fish measured during the MRFSS show a wide range of sizes for fish kept, 5"-29" FL. Most fish harvested appear to be 15-22" on the Atlantic coast (Table 6a) and 15-23" on the Gulf coast (Table 6b).

### Combined Harvest

Combined harvest estimates were 183,000-590,000 pounds on the Atlantic coast during 1992-1995 when the 'best' estimates for recreational catch were available. The combined harvest on the Gulf coast was generally less than 100,000 pounds. This was subject to wide variation since estimates were made from so few intercepts with few fish measured. Commercial landings comprise only 10% of the landings on the east coast and about 2% on the west coast.

## III. ASSESSMENT

### Trends in abundance

Catch-per-unit-effort (CPUE) is often used as a relative index of abundance of fishes. These data are available for tripletail from the Marine Recreational Fishery Statistics Survey and the Florida Marine Fisheries Information System. The recreational index is the mean number of tripletail caught per angler hour by anglers who reported catching at least one tripletail of who stated they were targeting tripletail. This index was standardized by GLM procedures for county, month, number of anglers, and number of hours fished. The commercial index is the mean pounds of tripletail landed per trip, standardized by GLM procedures for county and month.

We only considered the recreational estimates from the east coast in the period 1992-1995 because the estimates for the west coast and on the east coast prior to 1992 were judged to be unreliable because of the low number of intercepts. Catch-per unit-effort varied without trend between 0.2-0.4 fish per angler hour with the highest value in 1992 (Figure 7).

Commercial CPUE was only available since 1990 (Figure 7). On the east coast, commercial CPUE varied without apparent trend between 4-7 pounds per trip. Catch-per-unit effort was lower on the west coast, varying, also with no apparent trend, between 2-5 pounds

per trip. The lack of trends in the CPUE values for recreational and commercial fisheries suggests that the population of tripletail has been stable over the years examined although because of the shortness of the time series, this conclusion should be viewed with caution.

### Mortality Estimates

Annual survival (S) was estimated using the Chapman-Robson method based on the catch at age data (Chapman and Robson 1960). Annual survival was then converted to a total instantaneous mortality rate (Z). The estimates of Z were 0.82 per year ( $S=0.44$ ) for males, 0.88 per year ( $S=0.42$ ) for females, and 0.84 per year ( $S=0.43$ ) for sexes combined. The instantaneous natural mortality rate (M) in similar fish species generally ranges from about 0.3 to 0.6 per year. If we use this range of values for natural mortality, then estimates of the instantaneous fishing mortality rate (F) for tripletail range from 0.22-0.52 for males, 0.28-0.58 for females, and 0.24-0.54 for sexes combined. These values indicate a low to moderate level of exploitation.

### Yield-Per-Recruit and Spawning Potential Ratios

Estimates of yield-per-recruit (YPR) and spawning potential ratios (SPR) were made for female tripletail using the preliminary estimates of growth, total mortality rate from the Chapman-Robson method, and the range of natural mortality noted above. Selectivity was set at 0.25 for age-0 and 0.50 for age-1. These are estimates based on examination of the catch curve. Given the uncertainty of many of the input parameters, these YPR and SPR analyses should be considered preliminary and therefore interpreted with caution.

From the YPR analysis, we calculated  $F_{max}$ ,  $F_{0.1}$ , and  $F_{30}$ .  $F_{max}$  is the level of fishing mortality that produces the maximum yield (in weight) per recruit.  $F_{30}$  is the fishing mortality rate that produces a static SPR of 30% and  $F_{0.1}$  is the fishing mortality rate at which the yield-per-recruit changes at a rate that is 10% of the initial rate of change. The shape of the YPR and SPR curves varied greatly depending on the value of natural mortality used (Figures 8 and 9).  $F_{30}$  varied between 0.39-0.77, and  $F_{0.1}$  varied between 0.55-1.51 (Table 7).  $F_{max}$  was calculated at 0.65 when natural mortality was set at 0.30 but could not be calculated at the higher levels of natural mortality because the relationship was asymptotic (Figure 8). This indicates that the population is resilient to growth over-fishing, assuming the preliminary estimates of growth are correct. Underestimating the ages of young fish, which we suspect may have occurred for some of the larger age-0 and age-1 fish, can greatly change the shape of the yield curve. Estimates of current SPR ranged from 21-57 % (Table 7).

### Present and possible future condition of the stock

The present condition of the stock is unknown due to the uncertainty associated with

the life history information and estimates of recreational landings. Comparisons of the present estimate of  $F$  (0.24-0.54) with the biological reference points ( $F_{max}$ ,  $F_{0.1}$ ,  $F_{30}$ ) suggest the stock is in relatively good condition at this time. Because tripletail are fast growing and appear to mature at an early age, it is likely that the stock(s) can sustain a relatively high fishing mortality rate. The population probably is stable at the current rate of fishing mortality. The recent enactment of a 15" minimum size, possession limits, and gear restrictions will reduce both recreational and commercial landings in 1996 and hence, reduce fishing mortality further. Although estimates of size at maturity are preliminary, it appears that the 15" minimum size will allow a portion of the population to reach maturity before reaching exploitable size.

#### IV. MANAGEMENT

##### History of management

No management regulations were in place for tripletail prior to January 1, 1996. Since that date, tripletail have been subject to a 15" (381 mm) minimum size for all harvesters. In addition, recreational fishermen have a 2-fish daily harvest and possession limit and commercial fishermen have a 10-fish daily limit. Tripletail has been designated a restricted species. Hook and line is the only gear currently allowed for the harvesting of tripletail with a 2 fish daily bycatch allowance for commercial fishermen using non-conforming gear.



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SPECIES:

**Lobotes surinamensis**      **Tripletail**

COAST :

Atlantic

Year	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995
Number of Intercepts	.	7	2	7	2	3	5	12	8	3	10	44	54	55	67
Number of Fish Caught	20,773	31,859	23,029	4,076	20,799	1,895	7,028	17,129	10,106	5,699	16,542	58,894	44,285	41,248	86,914
Number of Fish Released Alive	13,098	0	23,029	0	0	0	0	7,673	868	2,849	0	5,490	6,652	5,384	8,885
Number of Fish Harvested	7,675	31,859	0	4,076	20,799	1,895	7,028	9,456	9,238	2,849	16,542	53,403	37,633	35,864	78,029
Average Number of Fish Caught/Trip	.	4,000	4,000	0.286	4,000	1,000	1,400	1,667	0.750	1,667	1,200	1,841	1,185	0.909	1,358
Estimated Number of Directed Trips	.	7,965	5,757	14,268	5,200	1,895	5,020	10,277	13,475	3,419	13,785	31,992	37,366	45,373	63,991
Average Number of Fish Kept/Trip	.	4,000	0.000	0.286	4,000	1,000	1,400	1,083	0.625	1,000	1,200	1,659	1,000	0.800	1,209
Ratio Kept : Total	0.37	1.00	0.00	1.00	1.00	1.00	1.00	0.55	0.91	0.50	1.00	0.91	0.85	0.87	0.90
Average Number of Fish Caught/Angler	.	1,940	4,000	0.286	1,375	1,000	1,267	1,458	0.750	0.833	1,000	1,216	0.720	0.708	1,091
Estimated Number of Anglers	.	16,418	5,757	14,268	15,127	1,895	5,548	11,745	13,475	6,839	16,542	48,427	61,528	58,220	79,661
Average Number of Fish Caught/Hour	.	0.722	1,000	0.042	0.238	0.234	0.720	0.378	0.317	0.208	0.273	0.393	0.211	0.272	0.282
Estimated Number of Hours	.	44,109	23,029	96,174	87,576	8,094	9,765	45,271	31,885	27,355	60,521	149,809	209,861	151,740	308,747
Average Number of Fish Kept/Hour	.	0.722	0.000	0.042	0.238	0.234	0.720	0.205	0.281	0.125	0.273	0.327	0.176	0.246	0.247
Average Weight (lbs) of Fish Examined	.	5,102	.	3,527	2,838	2,352	2,480	8,929	4,354	.	16,534	6,779	5,077	4,004	7,115
Number of Fish Weighed	.	7	.	1	8	3	4	10	4	0	1	48	37	34	51
<b>Estimated Recreational Landings (lbs)</b>	.	162,545	.	14,379	59,037	4,456	17,430	84,427	40,223	.	273,517	362,027	191,046	143,596	555,190
<b>Estimated Commercial Landings (lbs)</b>	2,164	3,295	6,343	4,923	6,249	.	.	.	.	1	5,039	27,698	23,332	39,813	35,121
<b>Estimated Total Landings (lbs)</b>	.	165,840	.	19,302	65,286	4,456	17,430	84,427	40,223	.	278,556	389,725	214,378	183,409	590,311
Percent Commercial	.	2.0%	.	25.5%	9.6%	0.0%	0.0%	0.0%	0.0%	.	1.8%	7.1%	10.9%	21.7%	5.95%
Number of Commercial Trips	.	.	.	.	.	.	.	.	.	1	407	452	536	703	797
Average Number of Pounds/Trip	.	.	.	.	.	.	.	.	.	1.00	12.38	61.28	43.53	56.63	44.07

Data Sources: Recreational catch estimates were taken from the National Marine Fisheries Service's Marine Recreational Fisheries Statistical Surveys.  
Commercial landings data were taken from the National Marine Fisheries Service, Southeast Fisheries Science Center (1981-1985) and from the Florida Department of Environmental Protection's Marine Fisheries Information System (1986-1995 through Trip Ticket Batch 411).

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DATA: TRIPLE.WORKING

PROGRAM: TRIPMO SAS

TABLE 2. FLORIDA TRIPLETAIL LANDINGS BY MONTH AND COAST

YEAR	MONTH	COAST			
		ATLANTIC		GULF	
		TRIPLETAIL		TRIPLETAIL	
		TRIPS	POUNDS	TRIPS	POUNDS
91	JANUARY	40	390	7	28
	FEBRUARY	43	570	4	23
	MARCH	19	176	4	38
	APRIL	30	174	.	.
	MAY	12	344	1	5
	JUNE	17	104	4	40
	JULY	16	83	5	2,186
	AUGUST	10	43	3	14
	SEPTEMBER	23	158	5	43
	OCTOBER	59	235	2	6
	NOVEMBER	43	356	1	1
	DECEMBER	95	2,406	.	.
	ANNUAL	407	5,039	36	2,384
92	JANUARY	46	548	3	32
	FEBRUARY	45	728	3	26
	MARCH	54	16,215	5	23
	APRIL	28	360	5	47
	MAY	16	308	6	21
	JUNE	44	3,527	7	40
	JULY	38	1,146	5	29
	AUGUST	12	160	1	6
	SEPTEMBER	19	166	3	114
	OCTOBER	45	1,048	3	8
	NOVEMBER	64	2,923	1	2
	DECEMBER	41	569	2	10
	ANNUAL	452	27,698	44	358
93	JANUARY	57	840	.	.

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YEAR	MONTH	COAST			
		ATLANTIC		GULF	
		TRIPLETAIL		TRIPLETAIL	
		TRIPS	POUNDS	TRIPS	POUNDS
93	FEBRUARY	36	297	.	.
	MARCH	66	5,418	.	.
	APRIL	35	227	3	11
	MAY	36	10,199	1	4
	JUNE	39	1,191	.	.
	JULY	25	386	1	4
	AUGUST	20	340	.	.
	SEPTEMBER	19	224	8	156
	OCTOBER	32	720	4	19
	NOVEMBER	93	2,272	3	16
	DECEMBER	78	1,218	.	.
	ANNUAL	536	23,332	20	210
94	MONTH				
	JANUARY	51	660	.	.
	FEBRUARY	69	5,274	.	.
	MARCH	78	19,732	3	80
	APRIL	46	2,079	11	59
	MAY	39	1,072	2	6
	JUNE	90	4,389	15	90
	JULY	40	801	8	175
	AUGUST	34	462	10	157
	SEPTEMBER	33	922	13	120
	OCTOBER	68	1,200	6	33
	NOVEMBER	90	1,481	.	.
	DECEMBER	65	1,741	3	14
	ANNUAL	703	39,813	71	734
95	MONTH				
	JANUARY	93	833	4	31
	FEBRUARY	68	751	6	32

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		COAST			
		ATLANTIC		GULF	
		TRIPLETAIL		TRIPLETAIL	
		TRIPS	POUNDS	TRIPS	POUNDS
YEAR	MONTH				
95	MARCH	118	6,431	7	250
	APRIL	126	6,277	10	60
	MAY	138	9,143	16	80
	JUNE	78	6,035	10	214
	JULY	29	912	4	158
	AUGUST	11	220	5	26
	SEPTEMBER	24	380	5	42
	OCTOBER	39	1,275	2	5
	NOVEMBER	59	2,474	.	.
	DECEMBER	14	390	1	9
	ANNUAL	797	35,121	70	907

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PROGRAM: TRIPSPL SAS DATA: EDITED BATCHES 1 - 411

TABLE 3. FLORIDA TRIPLETAIL SPL LICENSES AND ANNUAL PRODUCTION SUMMARY

YEAR	POUND CATEGORY	COAST					
		ATLANTIC			GULF		
		NUMBER OF LICENSES	TRIPS	POUNDS	NUMBER OF LICENSES	TRIPS	POUNDS
91	LESS THAN 100 LBS	171	356	2,509	28	35	213
	100 - 999 LBS	13	51	2,530	.	.	.
	1000 - 4,999 LBS	.	.	.	1	1	2,171
	TOTAL	184	407	5,039	29	36	2,384
92	POUND CATEGORY						
	LESS THAN 100 LBS	174	323	3,484	39	44	358
	100 - 999 LBS	22	94	6,438	.	.	.
	1000 - 4,999 LBS	2	24	5,916	.	.	.
	5,000 - 9,999 LBS	2	11	11,860	.	.	.
	TOTAL	200	452	27,698	39	44	358
93	POUND CATEGORY						
	LESS THAN 100 LBS	182	394	3,416	18	18	80
	100 - 999 LBS	17	124	5,079	1	2	130
	1000 - 4,999 LBS	1	5	1,731	.	.	.
	10,000 LBS OR MORE	1	13	13,106	.	.	.
	TOTAL	201	536	23,332	19	20	210
94	POUND CATEGORY						
	LESS THAN 100 LBS	217	467	3,749	43	63	506
	100 - 999 LBS	20	129	5,804	2	8	228
	1000 - 4,999 LBS	5	72	11,091	.	.	.
	5,000 - 9,999 LBS	1	14	6,743	.	.	.
	10,000 LBS OR MORE	1	21	12,426	.	.	.
	TOTAL	244	703	39,813	45	71	734
95	POUND CATEGORY						
	LESS THAN 100 LBS	209	473	4,115	48	67	393
	100 - 999 LBS	25	186	7,940	3	3	514
	1000 - 4,999 LBS	3	79	5,109	.	.	.
	5,000 - 9,999 LBS	3	59	17,957	.	.	.
	TOTAL	240	797	35,121	51	70	907



DEPARTMENT OF ENVIRONMENTAL PROTECTION  
FLORIDA MARINE RESEARCH INSTITUTE

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TABLE 4. FLORIDA TRIPLETAIL LANDINGS BY GEAR

YEAR	GEAR USED	SUB_REG			
		Atlantic		Gulf	
		TRIPS	POUNDS	TRIPS	POUNDS
92	UNKNOWN	35	875	4	30
	TRAWL	97	4,160	.	.
	GILL NET	219	17,803	30	149
	TRAMMEL	46	803	1	17
	OTHER	55	4,057	9	162
	TOTAL	452	27,698	44	358
93	GEAR USED				
	UNKNOWN	6	64	.	.
	TRAWL	62	2,558	1	4
	GILL NET	328	14,407	11	166
	TRAMMEL	57	512	1	6
	HAUL SEINE	2	12	.	.
	OTHER	81	5,779	7	34
94	TOTAL	536	23,332	20	210
	GEAR USED				
	UNKNOWN	19	1,386	.	.
	TRAWL	68	2,740	.	.
	GILL NET	446	28,500	35	224
	TRAMMEL	12	104	2	9
	GIG/SPEAR	20	1,532	.	.
95	HAUL SEINE	7	20	1	7
	OTHER	131	5,531	33	494
	TOTAL	703	39,813	71	734
	GEAR USED				
	UNKNOWN	7	249	.	.
	TRAWL	99	3,229	2	24
	GILL NET	473	23,945	28	150
	TRAMMEL	4	19	4	225
	GIG/SPEAR	3	89	.	.
	HAUL SEINE	2	7	.	.
	OTHER	209	7,583	36	508
	TOTAL	797	35,121	70	907

TABLE 5. COMMERCIAL SPECIES CAUGHT WITH TRIPLETAIL

DATA: TRIPLE.ED001411

	TRIPS	POUNDS
		POUNDS
SPECIES		
0	1	0
Bait fish (pounds)	38	5,644
Amberjack	31	4,028
Ballyhoo (numbers)	1	6
Bluefish	1,232	56,571
Bluerunner	75	900
Bonito (Little Tunny)	19	3,013
Cobia	235	7,617
Catfish	423	26,777
Croaker	145	1,237
Dolphin	112	17,488
Drum, Black	121	1,262
Eels	1	6
Flounders	785	24,888
Goggle Eye/Scad (pounds)	1	12
Grouper, Black	13	908
Grouper, Gag	27	2,182
Grouper, Red	29	17,877
Grouper, Scamp	12	460
Grouper, Snowy	8	920
Grouper, Yellowedge	3	476
Grouper, other	8	861
Grouper, mixed	5	282
Grunts	41	1,035

(CONTINUED)

COMMERCIAL SPECIES CAUGHT WITH TRIPLETAIL  
DATA: TRIPLE.ED001411

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	TRIPS	POUNDS
		POUNDS
SPECIES		
Herring, Thread	1	2
Snapper, Hog	5	67
Jack, Crevalle	490	33,968
Jack, Mixed	354	11,114
Jack, other	40	2,323
Mackerel, King	130	14,184
Ladyfish	149	9,153
Menhaden (Pogies)	278	81,445
Mullet, Black	177	12,726
Mullet, Black (red roe,lbs)	56	14,487
Mullet, Silver	47	4,444
Mullet, Black(white roe,lbs)	37	4,171
Nile Perch/Tilapia	3	98
Permit	275	5,235
Bait fish (numbers)	1	5
Pompano	1,301	79,887
Rays/Skates	2	179
Sand Perch	5	20
Sea Bass (common)	6	84
Seatrout, Gray	287	5,430
Seatrout, Silver	16	269
Seatrout, Spotted	444	7,419
Seatrout, Sand	8	17
Shad (common)	3	312

(CONTINUED)

COMMERCIAL SPECIES CAUGHT WITH TRIPLETAIL  
DATA: TRIPLE.ED001411

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	TRIPS	POUNDS
SPECIES		POUNDS
Shark	292	120,760
Shark fins	91	1,443
Sheepshead	901	21,510
Snapper, Lane	14	123
Snapper, Mangrove	155	1,574
Snapper, Mutton	44	762
Snapper, Red	14	456
Snapper, Silk	4	8,912
Snapper, Vermillion	17	2,290
Snapper, Yellowtail	10	1,642
Snapper, other	20	1,630
Snapper, mixed	7	177
Mackerel, Spanish	1,103	130,513
220	2	57
Spot	380	51,273
Swordfish	3	4,217
Tilefish, Golden	8	1,373
Tilefish, Gray	4	602
Triggerfish	22	1,518
Tuna, Blackfin	7	734
Tuna, Skipjack	3	92
Tuna, Yellowfin	7	1,062
Wahoo	18	934
Porgies	24	1,047

(CONTINUED)

COMMERCIAL SPECIES CAUGHT WITH TRIPLETAIL  
DATA: TRIPLE.ED001411

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	TRIPS	POUNDS
		POUNDS
SPECIES		
Whiting	640	68,214
Misc. food fish	631	13,780
Misc. industrial fish	32	9,004
281	1	21
283	5	56
291	37	448
292	16	696
293	2	9
299	1	6
Lobsters, Spiny (whole)	7	642
Lobsters, Spiny (tails)	1	12
Lobsters, Spanish (whole)	1	3
Crabs, Blue (lbs,hard)	12	7,352
Crabs, Blue (soft)	1	9
Crabs, Stone, jumbo	1	14
Crabs, Stone, large	1	14
Crabs, Stone, ungraded	1	88
Shrimp, Pink (tails)	1	2,821
Shrimp, Pink (whole)	1	1,828
Shrimp, White (tails)	191	175,550
Shrimp, White (whole)	77	54,500
Shrimp, Brown (tails)	9	9,637
Shrimp, Brown (whole)	4	2,666
Shrimp, Rock (whole)	1	2,777

(CONTINUED)

Table 6a. Actual total-length measurements of landed tripletail from MRFSS angler-interview data, 1982-1995 (Atlantic Coast).

East Coast

INCH_TL	YEAR											
	82	84	85	86	87	88	89	92	93	94	95	
	N	N	N	N	N	N	N	N	N	N	N	
8	.	.	.	.	2	.	.	.	.	.	.	
9	.	.	.	.	.	.	.	1	.	.	.	
10	.	.	.	1	.	.	.	1	.	.	.	
11	.	.	1	1	.	.	.	3	4	1	.	
12	1	.	.	.	.	.	.	1	2	3	1	
13	1	.	2	.	.	1	.	3	4	1	.	
14	1	.	1	.	.	1	.	2	4	1	.	
15	.	.	.	.	.	1	.	1	2	6	7	
16	1	.	1	.	1	2	.	3	2	7	8	
17	.	1	.	.	.	.	.	5	.	4	4	
18	1	.	2	1	.	.	.	4	5	5	7	
19	.	.	.	.	1	2	1	3	3	4	3	
20	1	.	1	.	.	.	.	3	5	1	5	
21	.	.	.	.	.	.	.	3	1	.	7	
22	.	.	.	.	.	.	1	2	1	.	5	
23	.	.	.	.	.	1	.	4	.	1	2	
24	.	.	.	.	.	.	.	4	1	.	5	
25	1	.	.	.	.	.	.	2	3	.	1	
26	.	.	.	.	.	.	.	1	.	.	.	
27	.	.	.	.	.	1	.	2	.	.	.	
29	.	.	.	.	.	.	.	.	.	1	1	
Annual	7	1	8	3	4	9	2	48	37	35	56	

Table 6b. Actual total-length measurements of landed tripletail from MRFSS angler-interview data, 1982-1995 (Gulf Coast).

West Coast

	YEAR											
	82	84	86	87	88	89	90	91	92	93	94	95
	N	N	N	N	N	N	N	N	N	N	N	N
INCH_TL												
5	1	.	.	.	.	.	.	.	.	.	.	.
11	.	.	1	.	.	.	.	.	.	.	.	2
12	.	.	2	.	.	.	.	.	.	.	.	.
13	.	.	.	.	.	.	.	1	.	.	1	3
14	.	.	.	.	.	.	.	.	.	1	1	.
15	.	.	1	.	.	.	.	.	.	3	2	2
16	.	.	.	1	.	.	.	1	.	1	1	.
17	.	.	.	.	.	.	1	.	.	1	2	1
18	.	.	.	1	.	.	.	3	1	1	2	.
19	.	.	1	.	.	.	.	.	.	.	1	.
20	.	.	.	1	.	.	.	1	.	1	2	.
21	.	.	.	.	1	.	.	2	.	1	.	.
22	.	1	.	.	.	.	.	.	.	1	.	1
23	.	.	.	.	.	1	1	3	.	.	1	.
24	.	.	.	.	1	.	.	.	.	.	.	.
25	.	.	.	.	1	.	1	.	1	.	2	.
27	.	.	.	.	.	.	.	.	.	.	1	.
Annual	1	1	5	3	3	1	3	11	2	10	16	9

Table 7. Biological reference points for female tripletail in Florida at three levels of natural mortality.

Natural Mortality (M)	Total Mortality (Z)	Fishing Mortality (F)	SPR	F30	F0.1	Fmax
0.3	0.88	0.58	21%	0.39	0.55	0.65
0.45	0.88	0.43	35%	0.56	1.03	----
0.6	0.88	0.28	57%	0.77	1.51	----



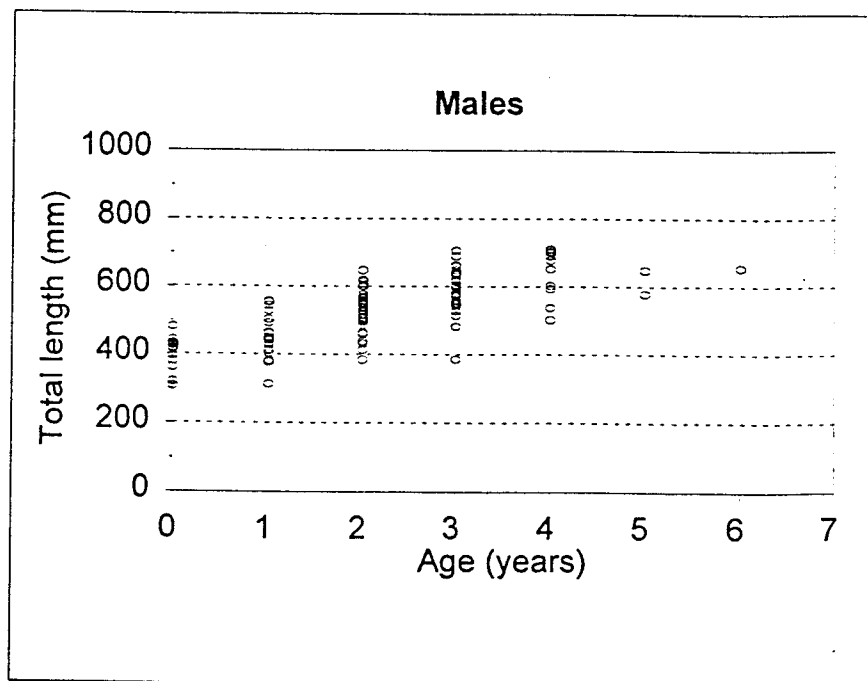
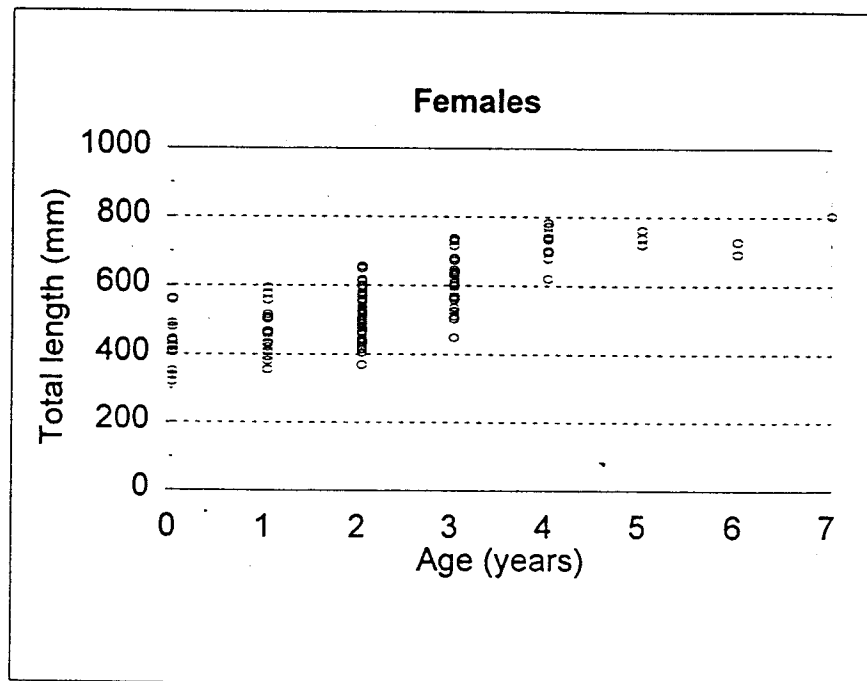
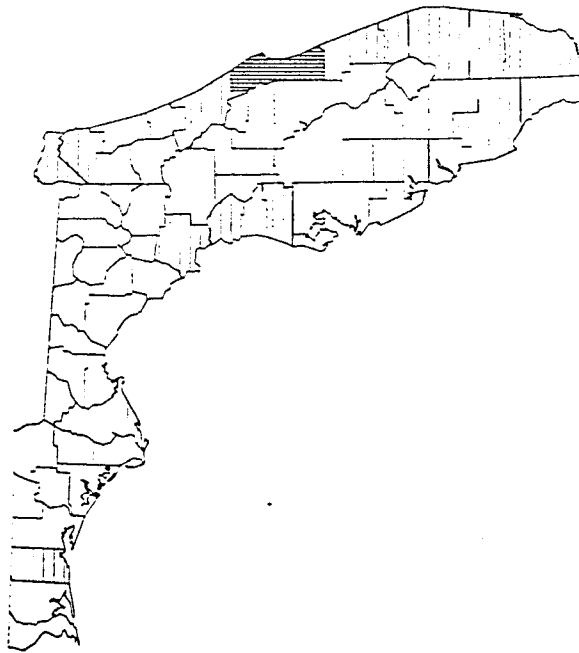


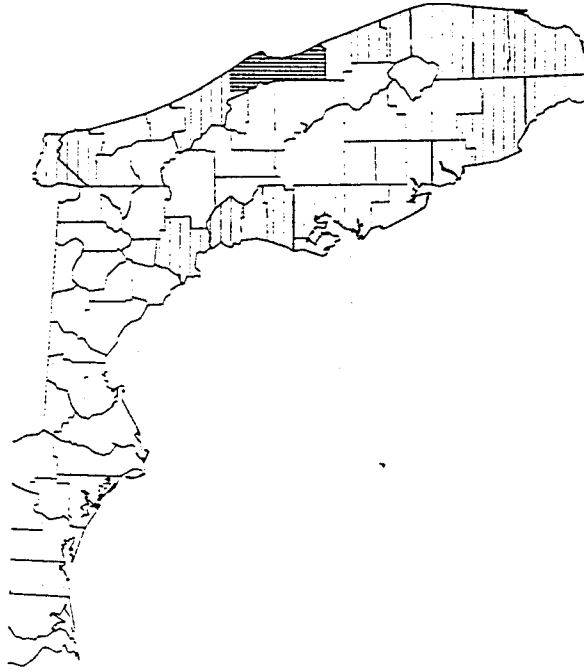
Figure 1. Preliminary estimates of length at age for tripletail from Florida waters.

Figure 2. Geographical distribution of commercially landed tripletail in Florida for 1994 and 1995. Legend: solid black - more than 50,000 pounds; fine crosshatch - 10,001-50,000 pounds; coarse crosshatch - 5,001-10,000 pounds; horizontal lines - 1 - 5,000 pounds; blank - no reported landings.

1994



1995



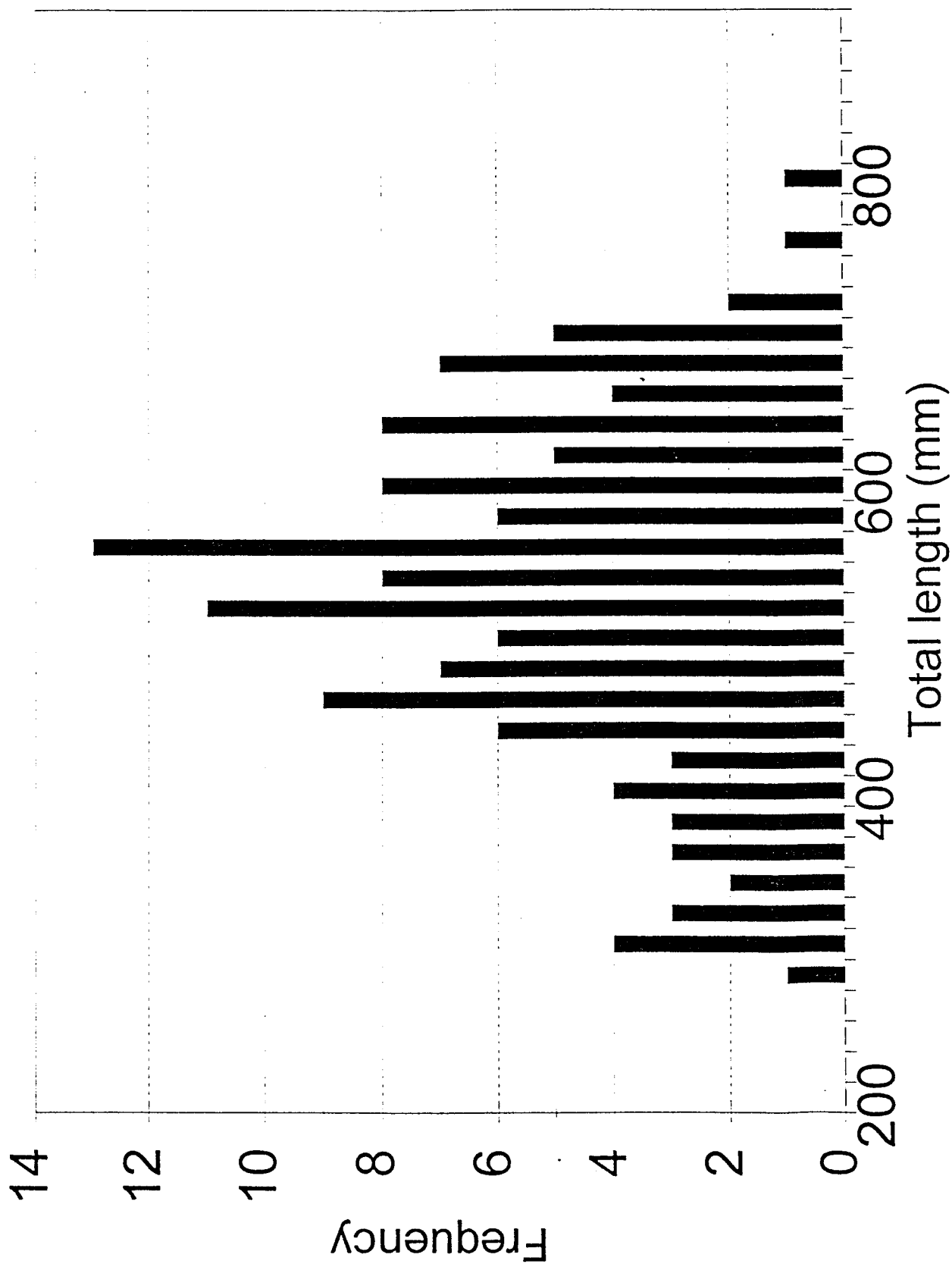


Figure 3. Length frequency of commercially landed tripletail in Florida (from TIP sampling).

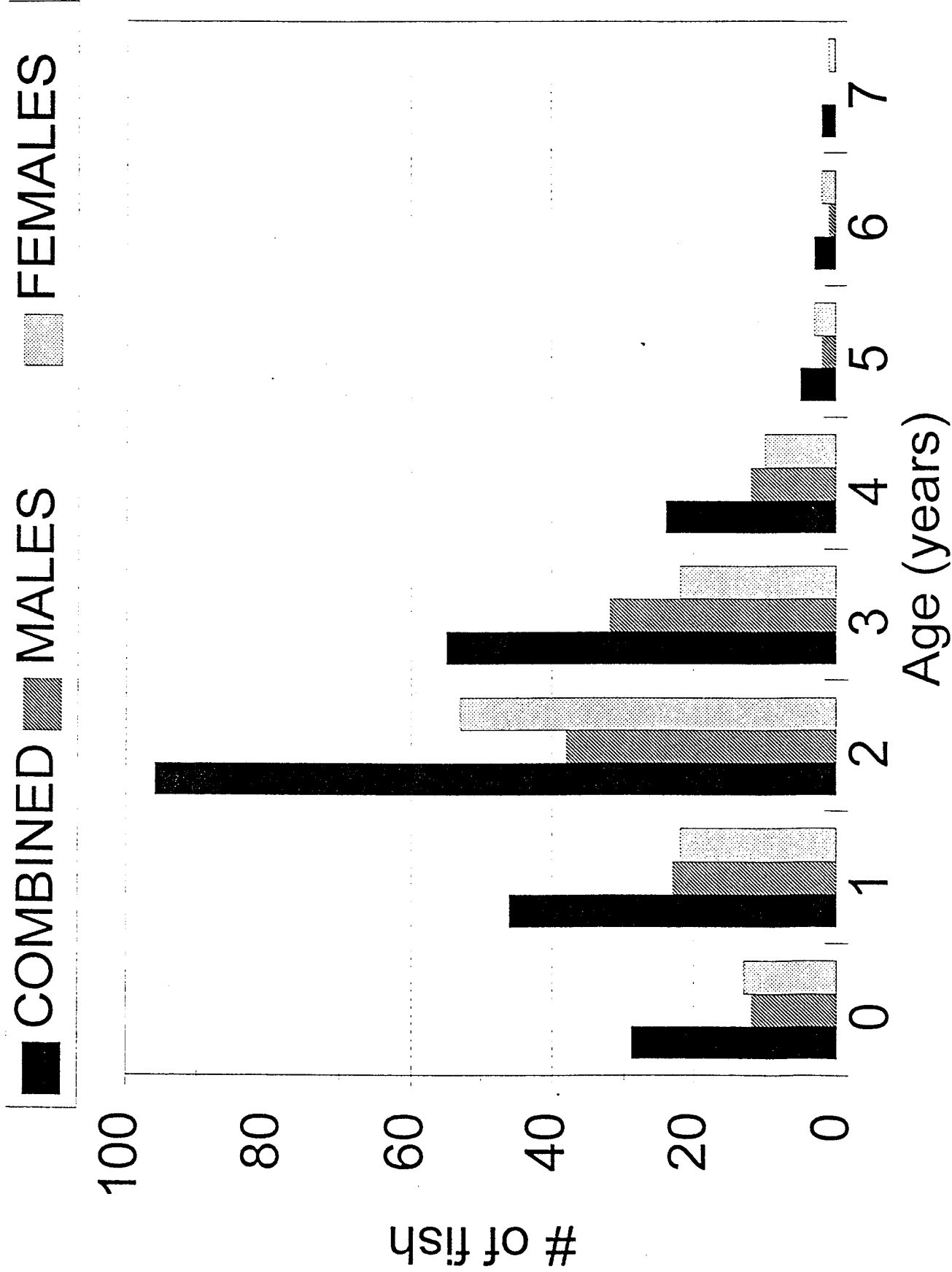


Figure 4. Catch curve for commercially caught tripletail in Florida.

# RECREATIONAL LANDINGS

## TRIPLETAIL -- ATLANTIC COAST

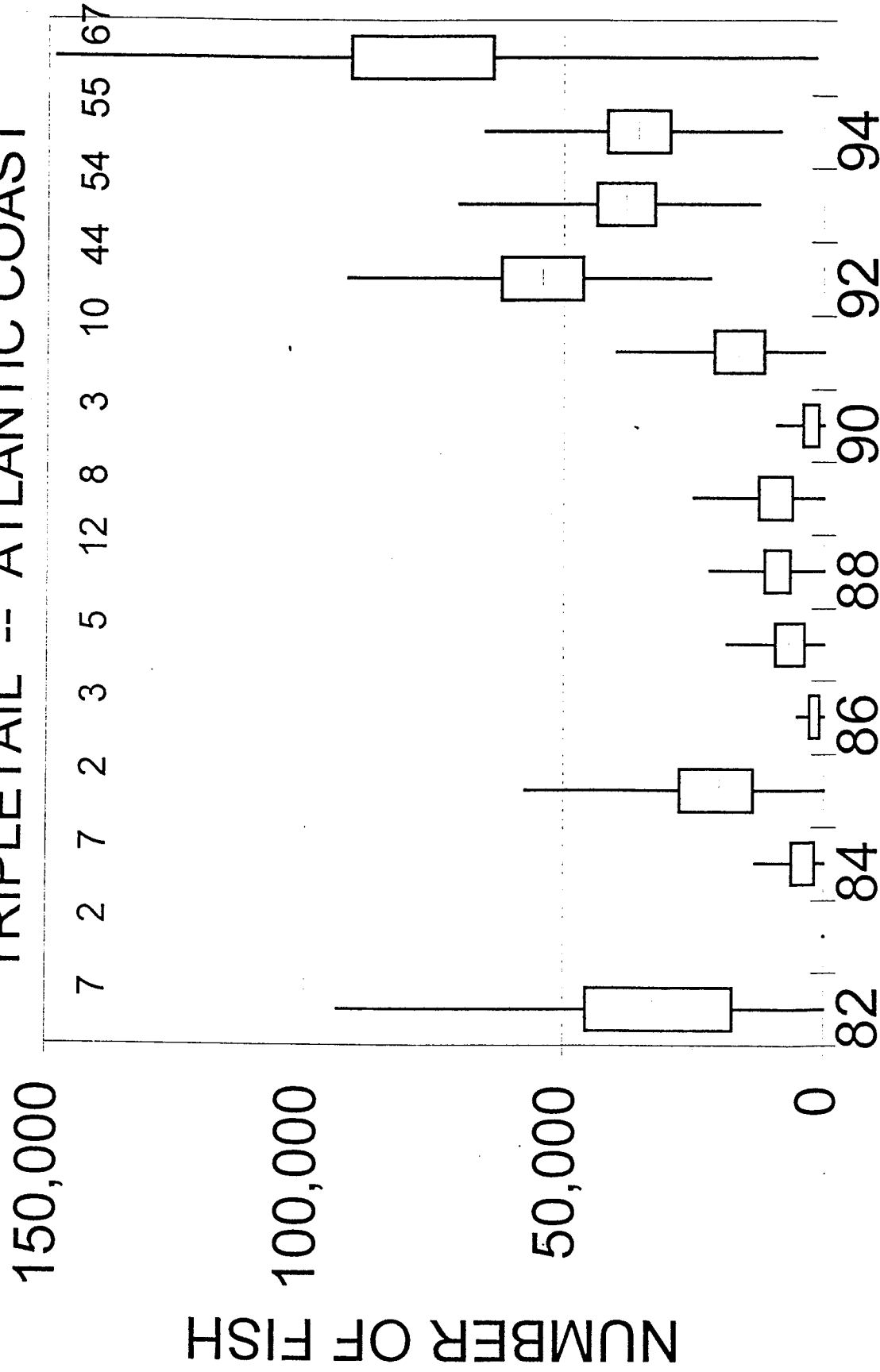


Figure 5a. Florida recreational tripletail landings on the Atlantic coast. Vertical bar indicates ranges of values, upper and lower limits of the box are the 25th and 75th quartiles, and the horizontal bar is the median.

# RECREATIONAL LANDINGS

## TRIPLETAIL -- GULF COAST

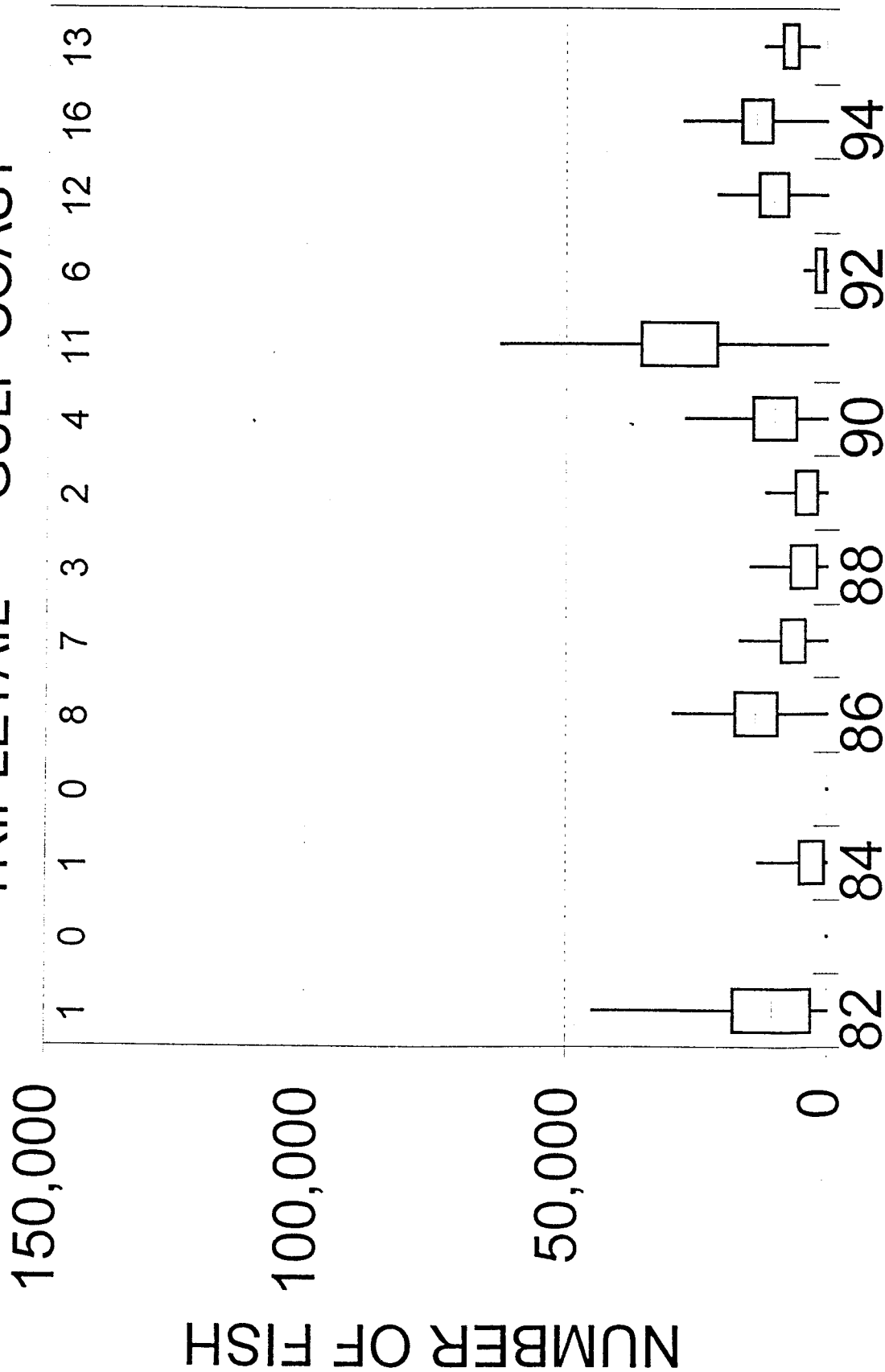
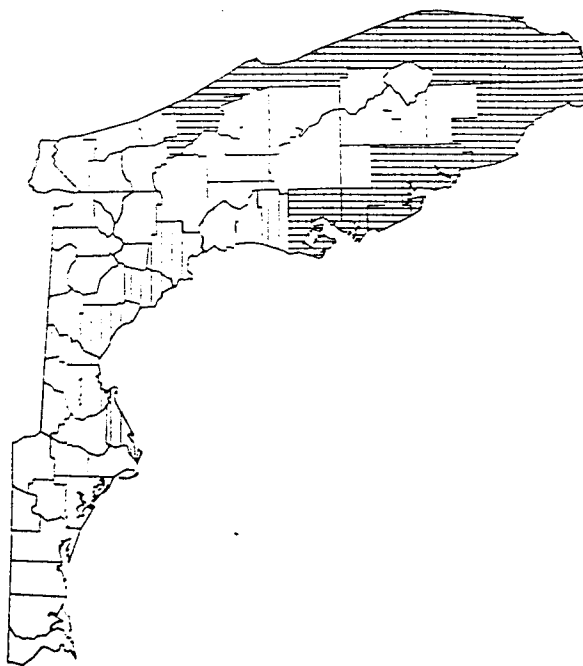


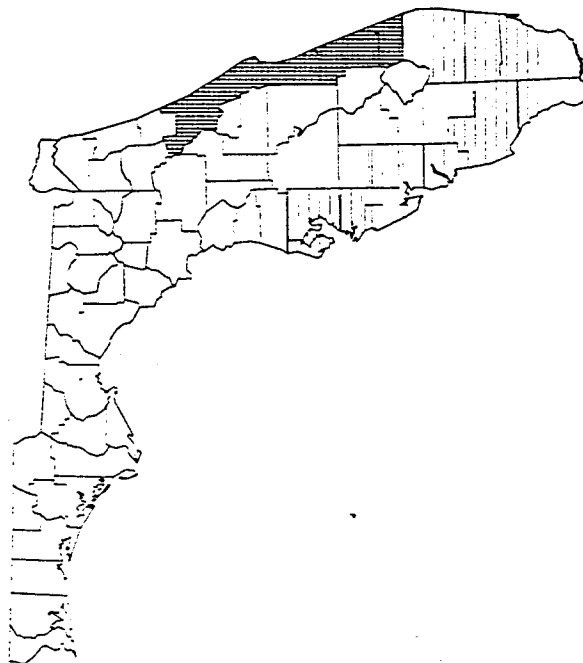
Figure 5b. Florida recreational tripletail landings on the Gulf coast. Vertical bar indicates ranges of values, upper and lower limits of the box are the 25th and 75th quartiles, and the horizontal bar is the median.

Figure 6. Geographical distribution of recreationally landed tripletail in Florida for 1994 and 1995. Legend: solid black - more than 100,000 fish; fine crosshatch - 50,001-100,000 fish; coarse crosshatch - 10,001-50,000 fish; horizontal lines - 1,001-10,000 fish; blank - less than 1,000 fish.

1994



1995



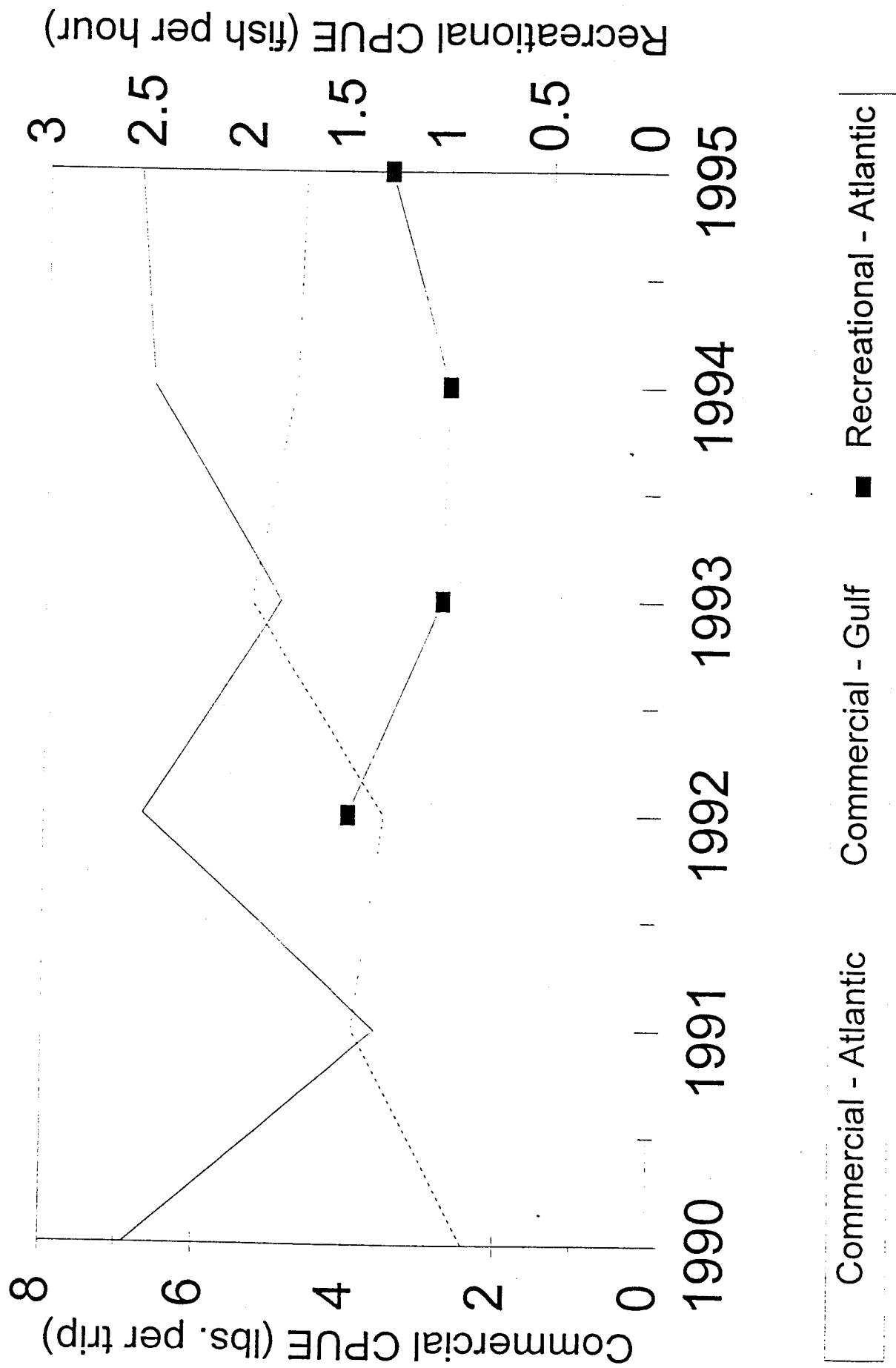


Figure 7. Catch-per-unit-effort in the Florida commercial and recreational tripletail fisheries.



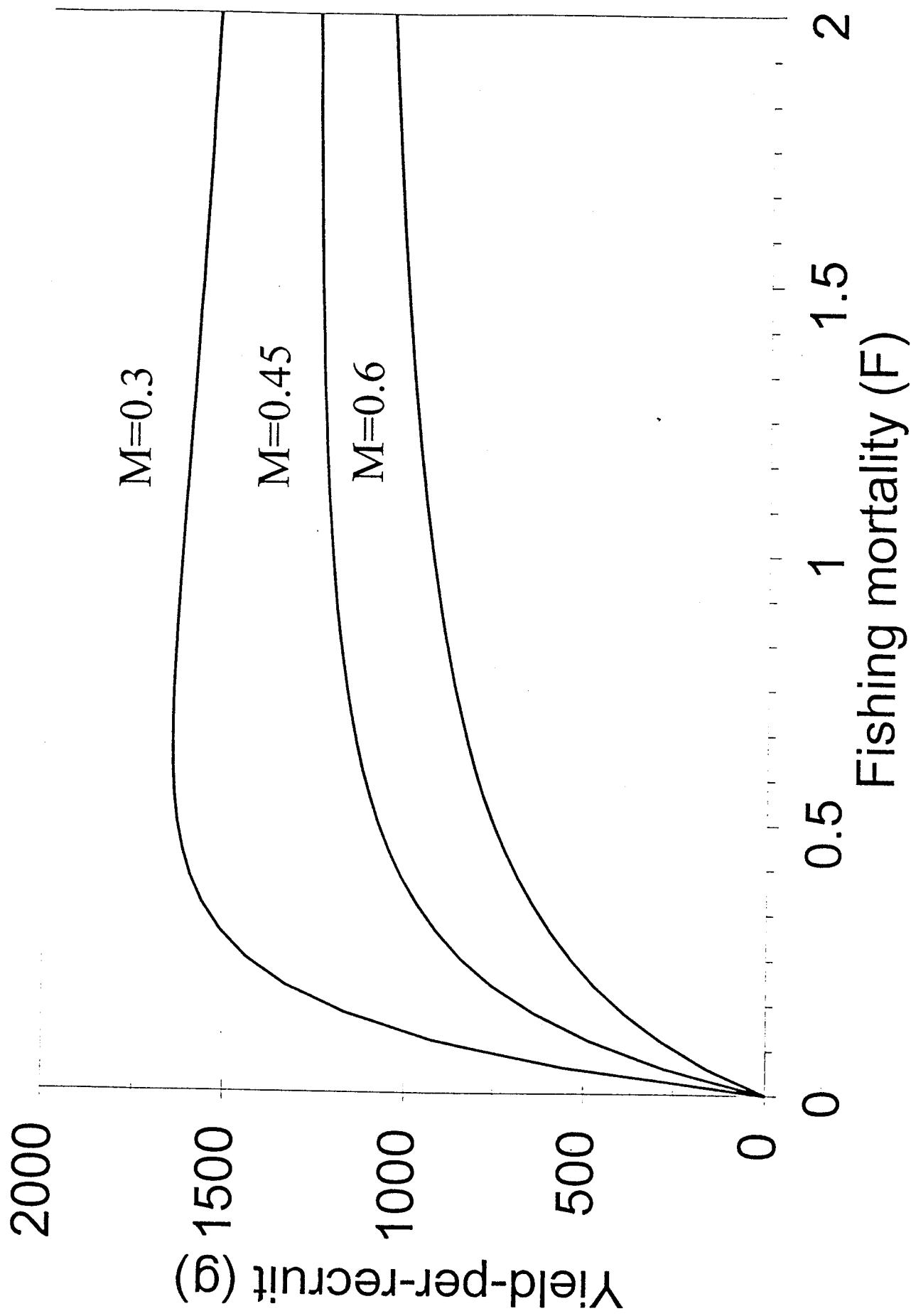


Figure 8. Preliminary estimates of yield-per-recruit for female tripletail in Florida at three levels of natural mortality.

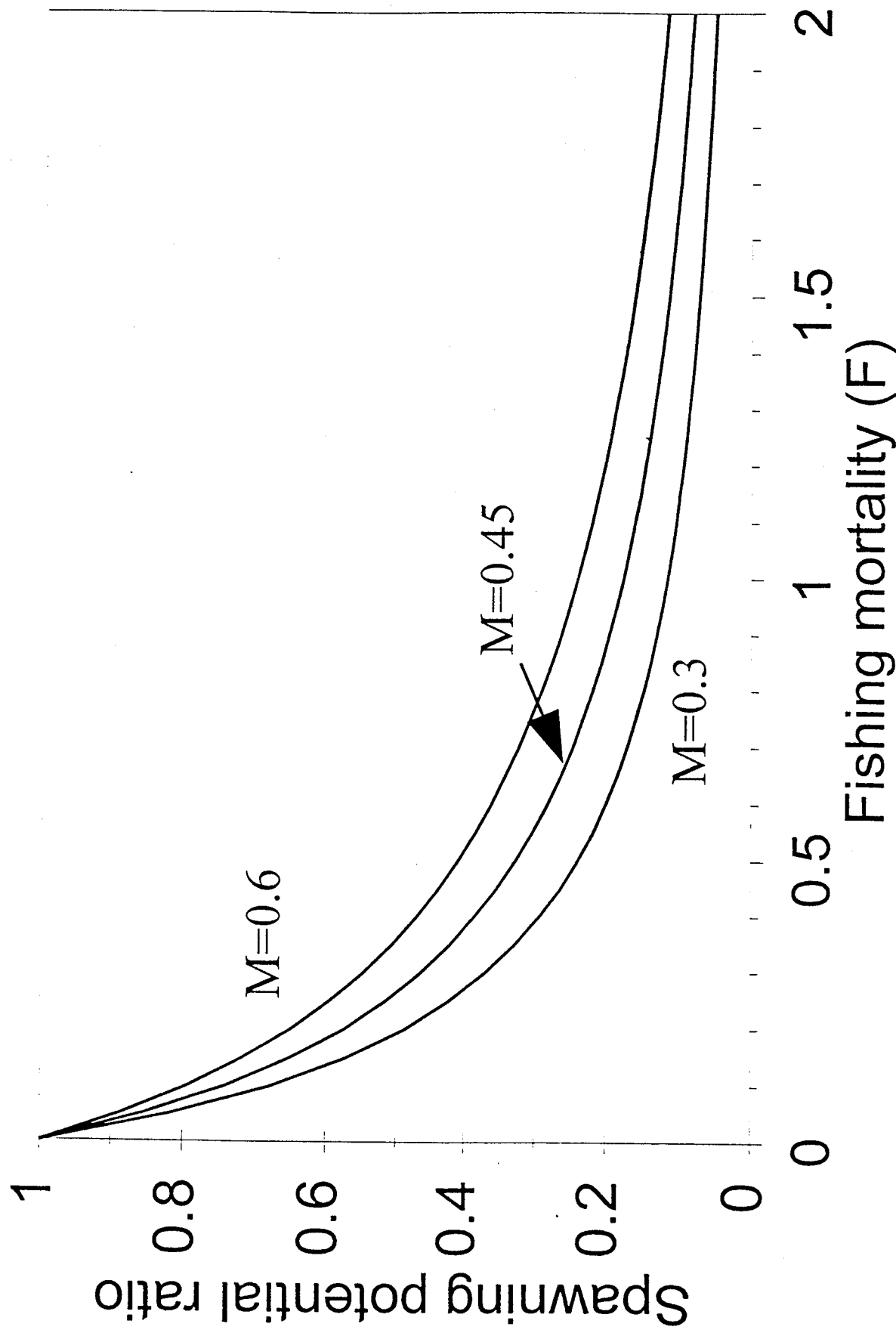


Figure 9. Preliminary estimates of spawning potential ratios for female tripletail in Florida at three levels of natural mortality.